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Investigating the effects of the benzylamine and epoxide product on the cell viability of MCF7 and SUM159 breast cancer cell lines

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Introduction

- Breast cancer is currently the most prevalent cancer in the world
- Selective estrogen receptor modulators and antibody-based therapies are effective against early-stage breast cancer
- Few treatment options exist for late-stage tumors lacking the progesterone, estrogen, and HER2 receptors (Triple Negative Breast Cancer)
- MCF7 breast cancer cell line represents early-stage breast cancer due to the presence of all three target receptors
- SUM159 breast cancer cell line is triple negative, providing a late-stage breast cancer model
- Hexylamine and epoxide product has cytotoxic effects against HL-60 human leukemia cell line (Xie and Hansen 2019)
- What are the effects of the benzylamine and epoxide product on the cell viability of early and late-stage breast cancer cell lines?

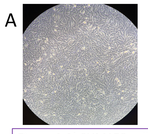
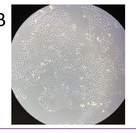
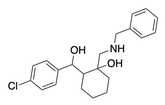
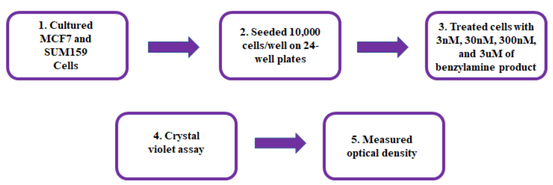
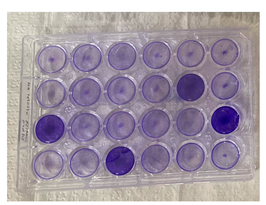
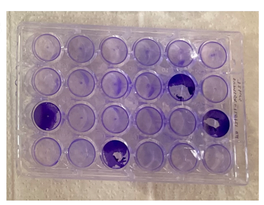
A  B  C 

Figure 1 A) SUM159 cells **B)** MCF7 cells **C)** The chemical structure of the benzylamine and epoxide product

Methods



A  B 

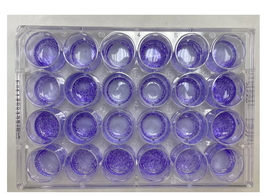
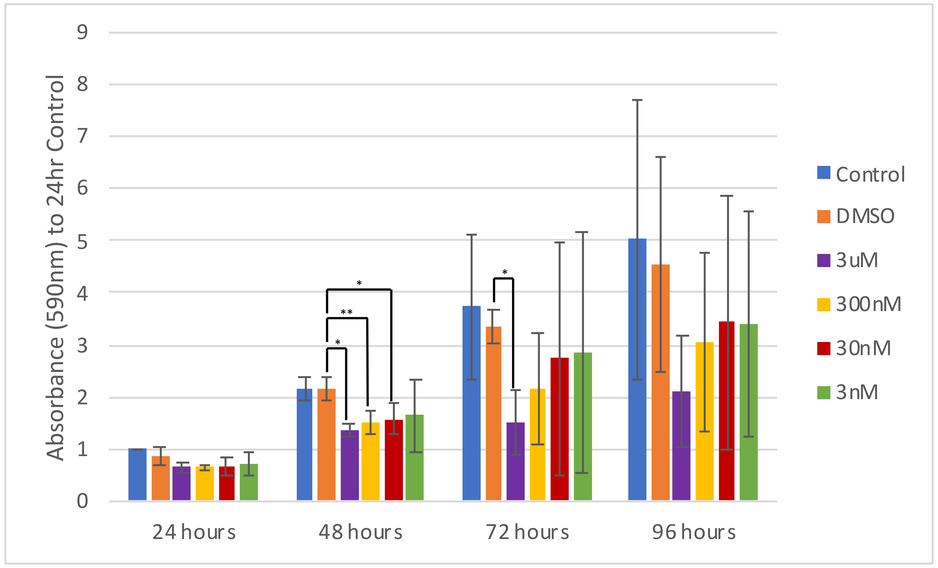
C 

Figure 2 A) SUM159 cells at 24 hours. Wells containing only media were very confluent. **B)** SUM159 cells at 72 hours. Cells flaked off during the crystal violet staining. We troubleshot by decreasing the number of cells seeded to 10,000 cells per well. **C)** MCF7 cells at 72 hours. Treatments were added in replicates of 4 to randomized wells to normalize for different evaporation rates across the plate.

Results

A



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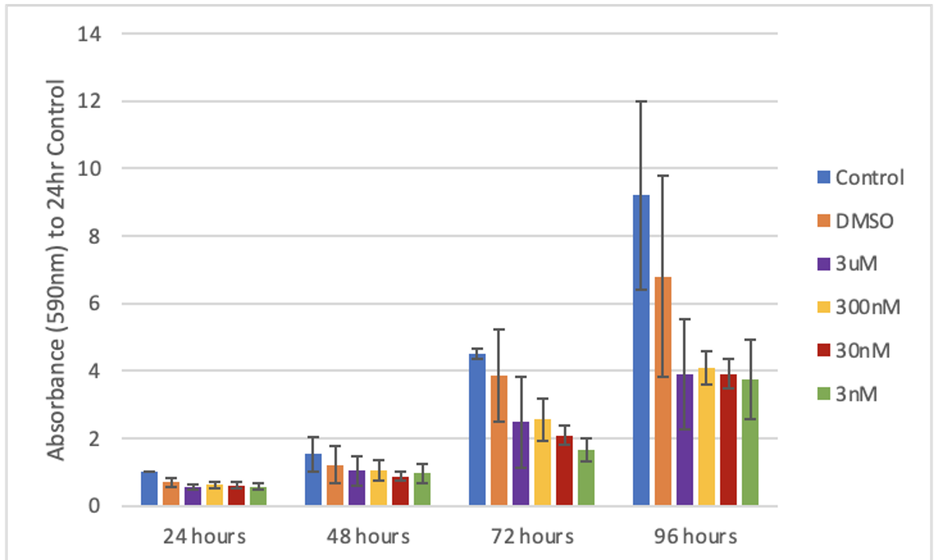

Figure 3 Cell viability in concentrations of benzylamine treatments of 3uM, 300nM, 30nM, 3nm compared to controls of cell media and a DMSO treatment. The absorbance of crystal violet-stained cells was measured at 590nm at 24, 48, 72, and 96 hours. Each treatment average absorbance was normalized to the cell media control absorbance and. **A)** MCF7 cell viability. n=3. **B)** SUM159 cell viability. n=2. At 24 hours n=3.

Conclusions

- The benzylamine-treated MCF7 cells had decreased cell viability compared to cells treated with DMSO
- The benzylamine-treated SUM159 cells had decreased cell viability compared to cells treated with DMSO

Future Work

- Continue repeating the current protocol in order to further confirm trends of decreased cell viability in benzylamine-treated cells
- Investigate the effects of the benzylamine product on normal human cells to ensure that benzylamine doesn't have cytotoxic effects on non-cancerous cells
- Confirm that benzylamine-treated cells are undergoing apoptosis via flow cytometry.
- Investigate the effect of benzylamine on prostate cancer cell lines
- Determine the cellular mechanisms or pathways involved in the cytotoxic effects of benzylamine
- Investigate potential co-treatment of benzylamine and vitamin D in breast cancer cells
- Treat MCF7 and SUM159 with other epoxide products synthesized in Dr. Jeff Hansen's organic chemistry lab

References

Xie, M., Hansen, J. (2019). *A Diversity-Oriented Synthesis Approach to Drug Discovery: β-Amino Alcohols* [Unpublished bachelor's thesis]. DePauw University.

Acknowledgments

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